

# A Study of Hospital Utilization by and the Cost of Care to Patients in a Private University Hospital in Seoul, Republic of Korea, 1955-1974

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In an attempt to understand the changing pattern of hospital care utilization and costs, a study was made of the medical and administrative records of 7,798 patients, who were discharged from a private, university teaching hospital in the years 1955, 1960, 1965, 1970 and 1974.

An analysis of the ages of the patients who utilized the hospital, revealed little change over the study in the age distribution of female patients, but did show increases in the percentages of male patients who were under 5 and over 60 years of age.

The overall average length of stay in hospital decreased continuously, from 17.1 days in 1955 to 10.4 days in 1974, and the average length of stay of those who were discharged within 90 days of admission decreased from 14.4 days in 1955 to 8.9 days in 1974. Patients who received surgical treatment remained in hospital for three to four days longer than did those who received non-surgical treatment. Obstetrical cases remained in hospital for 6.9 days in 1955, and 4.8 days in 1974. A large majority of the patients (87~96%) were discharged within one month of admission, and virtually all (97.5~99.4%) within three months.

In respect to the place of residence of the patients, the data revealed that 80% were from Seoul. Two-thirds of the patients from Seoul resided in districts immediately surrounding the hospital, showing that despite increasingly effective transportation facilities, hospital utilization continued to be localized to people living in areas near the institution.

The study revealed little change in disease patterns over the years: the percentage of obstetrical admissions remained highest with infectious and parasitic diseases, gastrointestinal diseases, injuries, neoplasms and respiratory diseases ranking in descending order.

The status of patients at time of discharge showed improvement: the recovery rate increased, and the proportion of patients who died decreased.

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Total hospital expenses increased 4.4 times and expenses per patient day increased 6.2 times, both results having been determined through the use of constant market prices. It is considered that the latter increase resulted primarily from intensification of medical care and shortening of the hospitalization period.

Among the various components of hospital care costs, room (hotel-type) and treatment expenses remained at approximately 40% of the total, while expenses for drugs and injections were approximately 20% in each of the five years of the study. Study of the relative increase of hospital costs by component of care revealed that the highest increases over the twenty-year period was in the cost of laboratory services, followed by drugs and injections. It would seem that these high increases resulted from rapid technological developments in diagnostic and therapeutic procedures.

Medical care is not a privilege; it is a basic human right. Therefore, comprehensive medical care of good quality must be available to every individual, whenever and wherever required. Such provision is the goal of medical care services, and a government has a responsibility to make such services available to all of its citizens.

In many countries today, the needs for medical care services are not met. Medical care technology has developed rapidly but the money available to pay for the services has not been adequate to meet the sharp increases in the cost of same. In addition to limitations in financial resources, physical facilities and equipment, there are certain inadequacies in respect to health manpower. Furthermore, ineffective use of existing resources adds to the problems created by limitations and other inadequacies. Therefore, it is essential that each country exert efforts designed to plan and provide for the health of its people through the implementation of a health care delivery system which is locally suitable, and is based on available resources.

The scientific study of hospital care, which is the core of western medicine, constitutes an effort to achieve such a health care delivery system. Many such studies have been done at the national level in developed countries, but

few have been undertaken in Korea. To the present time, efforts in Korea have been mainly in the form of health interview surveys, in which subjective information was collected from the population in respect to disease prevalence, medical care expenditure, medical institution attended, and related aspects of health and health care. (Yang 1960, Kim 1970, Lee et al 1970, Johnson et al 1970, Yu 1972).

To plan and provide effectively for such aspects of the health field as the supply of manpower (based on demand), the number of hospital beds, the number and location of hospitals and requirements for other physical facilities and equipment, it is necessary to have information on the length of hospitalization, the location from which patients come, changing patterns of hospital utilization etc. The review of the medical care utilization-related factors is also important to the educational authorities responsible for the curricula of medical students and residents.

The rapid increase in the cost of medical care has stimulated increased interest on the part of governments, business establishments, labor unions, economists and the general public, and it has been found that there has been insufficient study of the reasons for the rapid increases in the cost of providing medical care in Korea (Abel-Smith B. 1967, Feldstein 1970).

Since the declaration in Paris after World War II that medical care is a basic human right and not a privilege, the social services sectors of governments have attempted to assure their peoples (either directly or indirectly) of this important right, by steadily increasing government expenditure in, or GNP allocation for, health concerns (Fry J. 1970).

Health care costs consist not only of individual or family out-of-pocket medical care expenditures but also those related to the education and employment of health personnel, promotive and preventive health services, medical research, capital investment in hospitals and other health premises, etc. These cost-related factors require study and planning at the central level of a governmental organization. In the Republic of Korea, there is limited data on health care costs, and such information as is available on medical care costs consists of figures provided by the Economic Planning Board on consumption expenditure.

In respect to the utilization of medical care services, the author and others undertook studies of ambulatory care on Koje Island (1972) and Kangwha Island (1975), and certain information is presented in the statistical year book published by the Ministry of Health and Social Affairs.

It is very difficult to compare hospital care services in Korea because hospitals differ from each other in several aspects: hospitals may be public or private, teaching or non-teaching, general or special (such as psychiatric and tuberculosis), privately or juridical body owned, urban or rural, etc. Furthermore, there are differences in respect to the type and content of medical and other records maintained by the various hospitals.

Therefore, for this study, the author selected one private university hospital, which is 90

years old and is located in the capital of Korea, the city of Seoul. Studied and analyzed were the location of the residences of patients, the length of hospitalization, diagnoses, kind of care received, and patient expenditure on hospital care, etc. The purpose of the study was to ascertain the changing pattern of hospital care utilization and cost.

## METHODS

### A. Study Population

Selected to form the population for the study were all patients discharged from the private-university hospital at five year intervals commencing in 1955, making for the years selected being 1955, 1960, 1965 and 1970. In addition, included in the population were patients discharged in 1974, because of the expectation of finding significant changes having taken place after 1970.

The annual period was the calendar year, resulting in the population consisting of 49,696 patients who were discharged from hospital between January and December of the five years noted above.

The study is based on the hospital records of these patients.

### B. Study Sample

It was impossible to decide on the sample size based on sampling formula because the variables were numerous and basic data on these variables were not available. Therefore, it was decided arbitrarily to take a sample of approximately 1,300 in the years 1955 and 1960, and 1,600 in 1965 and thereafter. As the records of the newborn were maintained separately to those of their mothers commencing in 1970, these were also sampled in 1970 and 1974,

**Table 1. Total Number of Patients Discharged, Sampled and Analyzed**

Year	Total Number of Patients Discharged(A)	Number of Patients Sampled (% to A)	Number of Patients Analyzed (% to A)
1955	3,133	1,257 (40.1)	1,257 (40.1)
1960	4,595	1,381 (30.1)	1,326 (28.9)
1965	8,534	1,729 (20.3)	1,613 (18.9)
1970	16,911	1,985 (11.7)	1,889 (11.2)
1974	16,523	1,785 (10.8)	1,713 (10.4)
Total	49,696	8,137	7,798

\* Figures in parentheses indicate percentage.

proportionately increasing the size of the sample.

Following a random start, systematic sampling was carried out, based on chronological date of discharge. A total of 8,137 hospital records were so selected. In view of loss of records and discrepancies between medical and administrative records, the sample analyzed consisted of 7,798 (Table 1).

### C. Data Collection, Processing and Analysis

A coding sheet was used to record information related to hospital care utilization and consumer expenditure, taken respectively from medical and administrative records. Coded data punched, and processed by computer.

Diagnoses were based on the A List of the International Classification of Diseases (WHO, 1967). In instances of two more diagnoses being recorded for a single patient, the major condition (based on the principal symptoms and treatment regime) was selected for the purpose of this study. The residence areas of the patients were recorded in terms of the administrative districts in effect at the time of hospitalization.

To determine trends in hospital care utilization, over the period of years selected for this study and based on a comparison of the rate

of consumer expenditure, the author used an index whereby 1955 was 100 and the increment index could be compared in terms of the selected years. The specific consumption expenses in each of the selected years were revalued to a constant market price, as of the 1970 consumer price index of the Economic Planning Board.

### Consumer Price Index (Seoul)

1970=100

1955	1960	1965	1970	1974
17.3	28.6	58.4	100.0	160.1

Source: Economic Planning Board

## RESULTS

### A. Age and Sex Distribution of Patients

Excluding the newborn who were included in the 1970 and 1974 samples, age and sex distribution were studied for each of the years selected for the study.

With exception of the years 1960 and 1965, there were more males admitted to hospital (Appendix Table 1).

Over the years in the time period studied, for males there was an increase in the percentage of patients who were 5 and over 60 years of age, and a decrease in the 30~50 age group; in females, there were slight increases in the under 5 and over 60 year age groups, with a peaking in the 20~29 years age group (Table 2).

Except for 1965, when the average age ( $\pm$  standard error) was  $33.5 \pm 0.5$ , the average of patients was around 29: namely,  $28.5 \pm 0.4$  in 1955,  $29.3 \pm 0.5$  in 1960,  $29.6 \pm 0.5$  in 1970 and  $29.8 \pm 0.5$  in 1974.

### B. Hospital Care Utilization

#### 1. Average length of hospitalization

The average length of stay in hospital decrea

Table 2. Percentage Distribution of Patients by Age and Sex

Age in Years	1955		1960		1965		1970		1974	
	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)
0~4	7.8	6.5	11.3	6.6	9.8	5.6	18.9	8.8	18.9	10.0
5~9	5.8	3.8	11.0	5.8	6.1	2.7	7.2	2.6	10.0	2.5
10~19	18.0	13.1	12.2	10.2	13.7	6.3	10.6	6.6	13.3	7.0
20~29	19.2	36.4	18.0	28.3	11.2	24.9	15.8	34.0	11.6	30.0
30~39	18.8	21.0	15.6	24.9	19.9	24.1	14.7	26.6	14.1	21.1
40~49	18.2	12.2	16.1	11.0	17.7	15.8	12.9	9.0	11.9	13.1
50~59	8.0	3.8	11.0	8.3	13.4	13.2	10.1	6.0	10.5	9.9
60~69	3.7	2.3	4.3	3.8	6.4	4.9	7.5	4.5	7.2	5.1
70 & over	0.5	0.6	0.5	1.1	1.7	2.0	1.5	2.0	2.6	1.4
Unknown		0.3			0.1	0.5	0.7			
Total	100.0 (N=600)	100.0 (N=657)	100.0 (N=672)	100.0 (N=654)	100.0 (N=824)	100.0 (N=783)	99.9 (N=734)	100.1 (N=891)	100.1 (N=731)	100.1 (N=809)

\* Newborn babies were excluded from the total in 1970 and 1974 respectively.

Table 3. Average Length of Hospital Stay by Kind of Hospital Care

Kind of Care	1955		1960		1965		1970		1974	
	Mean	S.E.								
Total Cases	17.1	0.6	15.4	0.6	13.0	0.6	12.7	0.6	10.4	0.6
(Median)	11.3		9.2		8.0		6.2		6.1	
Surgical	20.2	1.1	18.7	0.9	16.0	0.8	19.1	2.0	13.4	1.0
Obstetrical	6.9	0.4	5.7	0.2	4.7	0.1	4.5	0.1	4.8	0.3
Non-surgical	17.0	1.0	14.2	0.8	12.3	0.8	11.2	0.6	9.8	0.8
Length of Stay less than 90 days	14.4	0.4	13.7	0.4	11.6	0.3	10.2	0.3	8.9	0.2
Surgical	16.9	0.7	16.8	0.6	14.7	0.6	15.5	0.7	11.7	0.4
Obstetrical	6.9	0.4	5.7	0.2	4.7	0.1	4.5	0.1	4.8	0.3
Non-surgical	14.3	0.6	12.4	0.5	10.7	0.3	9.6	0.3	8.2	0.3

\* S.E.: Standard Error

sed a total of 6.7 days in the five calendar years studied: the average length of hospitalization being 17.1 days in 1955, 15.4 in 1960, 13.0 in 1965, 12.7 in 1970 and 10.4 in 1974.

The average length of stay was 3~4 days longer for surgical patients than for non-surgical. For obstetrical cases, the average length of stay was 6.9 days in 1955, followed by a decreasing trend: 5.7 day in 1960, 4.7 in

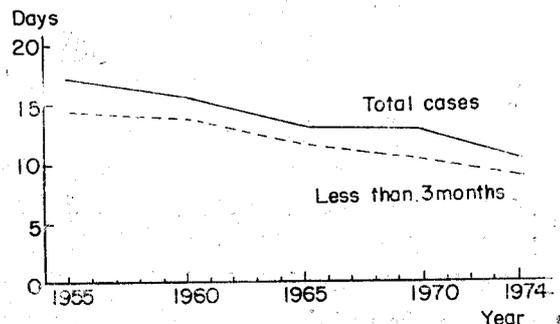


Fig. 1. Average Length of Hospital Stay

1965, 4.5 in 1970 and 4.8 in 1974 (Figure 1; Table 3).

The average length of stay of those patients who were discharged within 90 days of admission was found to be 1.4 to 2.7 days shorter than that of total sample: this average was 14.4 days in 1955, and had decreased to 8.9 days in 1974. In view of the short-stay nature of hospitalization for delivery, no difference was found in the average length of stay of obstetrical cases.

The median length of stay decreased over the period of time studied: 11.3 days in 1955, 9.2 in 1960, 8.0 in 1965, 6.2 in 1970 and 6.1 in 1974.

Cumulative percentages of length of stay in hospital showed that 64.7% of the patients were discharged within 14 days in 1955, 67.9% in 1960, 75.5% in 1965, 80.4% in 1970 and 84.4% in 1974. Within one month, the range of patients discharged was 87~96% and 97.5~88.4% were discharged within 3 months (Figure 2; Appendix Table 2).

In relation to the type of hospital accommodation, the average length of stay was longest

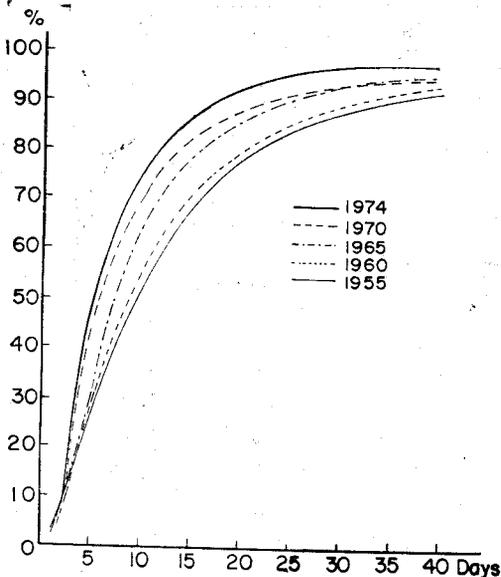


Fig. 2. Cumulative Percentage of Length of Hospital Stay

in the free ward. For both surgical and non-surgical patients, the average length of stay was shorter for those accommodated in semi-private rooms than for those in private rooms or wards and those accommodated in private rooms and wards tended to remain in hospital approximately the same length of time, on the average (Appendix Table 3).

For non-surgical conditions, the average length of stay for a specific condition, that of mental disorder, was 20~30 days, with shorter periods of hospitalization being required for gastrointestinal, respiratory, circulatory and genito-urinary diseases (Appendix Table 4).

For surgical cases, patients who had sustained accidents stayed longest in the hospital on the average -25~35 days-, while findings showed a trend towards decrease in the average duration of hospitalization of patients who received surgical treatment for tuberculosis, neoplasms and digestive disorders. The average length of stay for an appendectomy showed a decrease until 1965 and increased slightly thereafter. The average length of stay for tonsillar hypertrophy decreased (Appendix Table 5).

2. Residence areas of patients

Excluded from this aspect of the analysis of the findings were all the newborn in the 1970 and 1974 study samples. The residence areas of patients were determined on the basis of home addresses given on admission to hospital.

With slight variation in percentage in the individual years of the five years studied, the majority of the patients (approximately 80%) were from Seoul City and approximately 10% resided in each of Gyeonggi Province, and other areas of the country (Table 4).

When the hospital was located near the Seoul Railway Station, 60% or more of the patients residing in Seoul came from the districts in the immediate vicinity namely Junggu, Jongno, Seodaemun and Yongsan. After the hospital

Table 4. Percentage Distribution of Patients by Residence Area

Residence Area	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Seoul	79.2	77.8	74.0	83.6	78.3
1. Junggu	16.1	12.3	4.8	3.1	1.3
2. Jongno	13.2	10.4	7.7	4.9	2.5
3. Seodaemun	9.6	10.8	17.5	25.1	27.9
4. Mapo	4.1	4.9	13.8	15.8	12.5
5. Yongsan	14.7	15.1	6.8	4.1	4.4
6. Yeongdeungpo	5.3	7.6	9.4	15.9	16.5
7. Dongdaemun	3.2	5.5	4.2	4.2	3.4
8. Seongdong	4.5	5.4	5.4	4.6	3.7
9. Seongbug	4.4	4.5	4.1	4.8	5.7
10. Unknown	4.3	1.2	0.2	1.1	0.1
Gyeonggi (Urban)	3.3	3.5	3.0	2.8	2.1
(Rural)	9.8	6.6	9.1	5.8	7.0
Local (Urban)	2.4	5.8	4.7	3.3	5.5
(Rural)	4.7	5.4	8.2	4.2	6.9
Other	0.7	0.8	1.0	0.4	0.3
Total	100.1	99.9	100.0	100.0	100.1

\* Newborn babies were excluded from the totals in 1970 and 1974.

Table 5. Percentage Distribution of Patients by Condition

Diseases	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Tuberculosis of Respiratory System	2.3	3.3	7.5	3.8	2.7
Malignant Neoplasm of Stomach	1.8	1.4	2.9	1.2	0.9
Neurosis, Personality Disorder & Other Non-psychotic Mental Disorders	0.5	1.7	3.5	2.1	1.5
Hypertensive Disease	0.5	1.1	2.2	1.0	1.5
Cerebrovascular Disease	0.6	1.6	2.2	1.5	1.6
Hypertrophy of Tonsils & Adenoids	2.4	1.7	1.5	0.4	0.8
Peptic Ulcer	1.0	1.4	2.7	1.6	0.9
Gastritis & Duodenitis	0.8	2.9	2.7	1.5	1.2
Cholelithiasis & Cholecystitis	5.6	2.6	2.3	1.1	1.3
Appendicitis	1.2	0.8	1.8	1.5	1.3
Delivery (without Mention of Complication)	10.0	6.6	6.8	11.3	7.6
Fracture of Limbs	2.4	2.6	1.2	1.3	0.6
Intracranial Injury (excluding Skull Fracture)	0.4	1.8	1.2	2.0	2.9
Other Diseases	70.5	70.5	61.5	69.7	75.2
Total	100.0	100.0	100.0	100.0	100.0

was moved to its present location in the western part of Seoul, the percentages of patients coming from the new immediate vicinity (Seodaemun, Mapo and Yeongdeungpo districts) were 55% in 1965, 68% in 1970 and 73% in 1974. There was little variation over the years in the percentages of patients whose homes were in the Dongdaemun, Seondong and Seongbug districts.

Women admitted for obstetrical care were for the most part residents of Seoul City, the percentages of such admissions being 93.4% in 1955, 94.9% in 1960, and 1965, 98.2% in 1970 and 95.2% in 1974.

Comparing surgical and non-surgical patients, over the years 2~6% more of the latter were Seoul residents.

### 3. Diagnoses

The diagnoses recorded in the medical records of the patients were classified into 150 categories, according to the A List of the WHO International Classification of Diseases. In view of the low occurrence of many of the conditions, only 13 common diagnoses were selected for further analysis (Table 5).

The highest percentage of admissions were women who were assisted at delivery, without mention of complication. The percentage distribution of these cases in the 5 selected years was not significantly consistent. The next most common diagnosis was respiratory tuberculosis: the percentage (of admissions) suffering

from this condition increased until 1965, and decreased thereafter.

The third most common diagnosis was appendicitis and in this respect the percentage distribution decreased year by year. Intracranial injury (excluding skull fracture) showed a gradual percentage increase, and there was a decrease in the percentages of hypertrophy of tonsils and adenoids and of fracture of limbs. Otherwise, there was little difference in the percentages.

Among the 13 common diagnoses selected for further analysis, 4 conditions were of a gastrointestinal nature and 2 of a circulatory nature.

Classification of the diagnoses by system revealed no significant differences in the selected 5 years: obstetrical cases ranked top and following in order were cases of gastrointestinal disease, infectious and parasitic diseases (including tuberculosis), accident, neoplasm and respiratory disease (Appendix Table 6).

### 4. Kind of hospital care

In analyzing the kind of hospital care received, excluded from the sample were the newborn of 1970 and 1974. Hospital care was classified as surgical and non-surgical, with that of obstetrical care being included separately because of its special nature.

The percentage of patients admitted for surgical care decreased, while that of those admitted for medical care increased over the period of the study. From a high in 1955, there was a decrease until 1965 in the percentage of obste-

Table 6. Percentage Distribution of Patients by Kind of Hospital Care

Kind of Care	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Surgical	43.9	43.7	32.7	28.3	32.9
Obstetrical	13.2	8.9	7.3	17.3	10.8
Non-surgical	42.9	47.4	60.1	54.5	56.4
Total	100.0	100.0	100.0	100.0	100.0

※ Newborn babies were excluded from the totals in 1970 and 1974.

Table 7. Recovery Rate of Patients at Discharge

Outcome of Treatment	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Recovered	75.3	77.8	81.7	85.9	86.4
Not recovered	9.2	9.4	11.7	5.1	7.2
Self-discharged	8.9	7.8	3.6	6.2	4.4
Dead	5.8	5.0	2.9	2.8	2.0
Unknown	0.8		0.1		
Total	100.0	100.0	100.0	100.0	100.0

Table 8. Percentage Distribution of Patients by Type of Accommodation

Type of Accommodation	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Special Room	2.8	1.3	1.0	8.8	9.4
Private Room	16.9	6.8	10.1	2.4	6.4
Semi-Private Room	15.8	43.7	17.7	15.1	12.1
Ward	52.6	45.7	66.2	70.7	69.6
Free Ward	11.9	2.6	5.0	3.0	2.5
Total	100.0	100.0	100.0	100.0	100.0

trical cases admitted (Table 6).

##### 5. Patient status at discharge

Patient status at discharge was classified as recovered (or cured), not recovered (or incompletely cured), self-discharged and dead.

The percentage of patients who recovered increased year by year: 73.3% in 1955, 77.8% in 1960, 81.7%, in 1965, 85.9% in 1970 and 86.4% in 1974.

The percentage decrease in the number of patients who died was from 5.8% in 1955 to 2.0% in 1974, and a gradual decrease was shown in the percentages of patients who either did not recover or left hospital on their own decision (Table 7).

In the case of patients with neoplasms, increasing percentages of recovery were noted among those who received both surgical and non-surgical care (Appendix Table 7).

##### 6. Type of accommodation

Accommodation in the hospital was classified

as special room, private room, semi-private room (2~3 patients), ward (3~8 patients) and free ward.

(At present, section C of the Annex to the hospital premises consists of rooms which accommodate 2 patients in each. As these provide the same facilities as the private rooms mentioned above, they are classed as private rooms. All other rooms in the Annex building are special rooms).

In all of the years studied, more than 80% of the patients were accommodated in the semi-private and ward areas. In 1960, the percentage of semi-private room users was almost the same as that of the ward users, but in the subsequent years more than two-thirds of the patients were accommodated in wards.

In 1955, 12% of the patients were accommodated in the free ward but the percentage range in the other four years was from 2.5~5.0%.

Shown was a gradual increase after 1960 in

the percentage of patients occupying private and special rooms (Table 8).

### C. Hospital Care Expenses

#### 1. Components of hospital care expenses

The costs to the patients of hospital care were classified as room and treatment, drug and injection, X-ray, laboratory, special laboratory, surgical operation and assistance at delivery, doctors's fee and other.

The highest percentage of the cost was for room and treatment, such being 43.9% in 1955, 46.8% in 1970 and around 40.0% in the other three years. The next highest percentage of the cost was for drugs and injections, with an average of about 20.0% and a range from 18.1~22.1%.

The percentage of the cost for surgical operation and assistance at delivery in general showed a decrease over the years: 24.9% in 1955, 19.2% in 1960, 12.2% in 1965, 10.5% in 1970 and 12.7% in 1974.

The range in the percentage cost of laboratory and special laboratory services was 5.5~10.5%, and that for X-ray was 4.0~8.2%.

A system for the collection of doctor's fees<sup>1)</sup>

did not exist in 1955. After 1960, when the percentage expenditure on doctor's fees was 1.9%, there was a marked increase in the percentage cost of this component, being 7.7% in 1965, 7.9% in 1970 and 9.5% in 1974 (Table 9).

#### 2. Increase in hospital care expenses

##### a. Total hospital care expenses

Hospital care expenses were revalued to a constant market price, as of the 1970 consumer price index of the Economic Planning Board, and an index of expenses was used whereby 1955 was 100.

By 1960, expenses had double (index 208) but there was slight increase only in the subsequent five years, the index for 1965 being 222. High increases in the subsequent two five-year periods the index being 374 in 1970 and 441 in 1974-made for the total cost of hospitalization being increased 4.4 times over a period of 20 years (Figure 3; Table 10).

For surgical cases, there was a 6.0 times overall increase between 1955 and 1974, the greatest difference being between 1965 and 1970. For non-surgical cases, the increase in cost was more gradual, the total increase

Table 9. Percentage Distribution of Component of Hospital Care Expenses

Component of Hospital Care	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Room & Treatment	43.9	37.8	41.5	46.8	39.5
Drug & Injection	19.9	19.6	20.7	18.1	22.1
X-ray	4.0	6.6	8.2	4.6	5.7
Laboratory	5.4	7.8	8.0	10.0	9.2
Special Laboratory	0.1	1.6	0.9	0.5	1.0
Operation & Delivery	24.9	19.2	12.2	10.5	12.7
Doctor's Fee	—	1.9	7.7	7.9	9.5
Other	1.8	5.5	0.8	1.6	0.3
Total	100.0	100.0	100.0	100.0	100.0

(1) In general in Korea, costs of care given by doctors is included in charges made for drugs and injections. The "doctor's fees" referred to herein are those charged to patients indicating the specific medical specialist whom they wish to be their attending doctor while in hospital.

Table 10. Relative Increase of Hospital Care Expenses by Kind of Care (1955=100)

Kind of Hospital Care	1955	1960	1965	1970	1974
Expenses per Patient Stay	100.0	207.7	221.9	373.6	44.1
Surgical	100.0	223.1	256.2	583.4	601.3
Obstetrical	100.0	144.7	119.0	247.1	346.6
Non-surgical	100.0	190.8	218.0	321.8	387.8
Expenses per Patient Day	100.0	215.9	256.6	441.0	619.1
Surgical	100.0	226.4	278.8	613.1	754.4
Obstetrical	100.0	153.7	151.8	324.0	451.2
Non-surgical	100.0	235.1	299.0	459.9	677.4

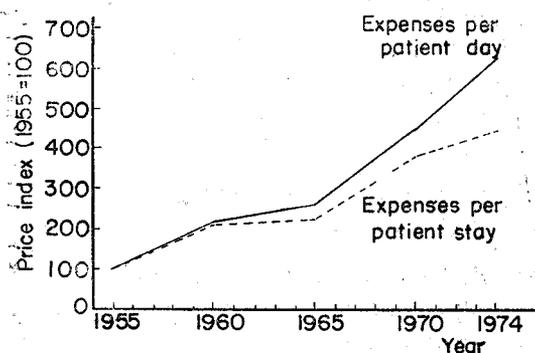


Fig. 3. Relative Increase of Hospitals Care Expenses

between 1955 and 1974 being times 3.9. With a slight drop in cost in 1965, following increase between 1955 and 1960, the total increase in cost for obstetrical care was times 3.5 at the end of the twenty years.

#### b. Hospital care expenses per day

Hospital care expense per day—that is, total cost divided by length of stay—increased more sharply than did the total cost of hospitalization.

Taking the cost per hospital day as 100 in 1955, this cost in succeeding years was as follows: 216 in 1960, 257 in 1965, 441 in 1970 and 619 in 1974. This made for a 6.2 times increases between 1955 and 1974. For surgical cases, the greatest increase took place between 1965 and 1970, with a 7.5 times increase between 1955 and 1974. For non-surgical cases, the increase in cost was somewhat less, being

6.8 times over this span of years. For obstetrical cases, there were sharper increases in cost between 1955 and 1960, and 1965 and 1970, with the total increase over the twenty years being 4.5 times (Table 10).

#### c. Expenses by component of hospital care

As noted above, the total cost of hospital care increased 4.4 times over the twenty years covered by the study. Looking at this increase in terms of the components of hospital care, increase in laboratory costs ranks at the top, with an 8.2 times increase between 1955 and 1974 and an especially dramatic increase of 2.4 times in 1970, over 1965. Second in rank in respect to increase in cost (per component of hospital care) was that for drugs and injections, which showed an increase of 6.5 times over the twenty-year period, with a sharp increase in 1970 similar to that for laboratory services. Increases in the cost of room and treatment, X-ray, and surgical operations (and assistance at delivery) were less dramatic, with the 1974 costs for X-ray and surgical operation showing 3.3~3.6 times increase over those of 1955. With 1960 as the base year, expenses for doctor's fees showed a 3.1 times increase in 1970 and 1974, over those of 1960 (Table 11).

#### d. Hospital care expenses per day by disease category

Hospital care expenses were reviewed by disease category. It was found that the cost of

Table 11. Relative Increase of Hospital Care Expenses by Component of Care (1955=100)

Component of Hospital Care	1955	1960	1965	1970	1974
Room & Treatment	100.0	178.9	217.3	350.6	329.5
Drug & Injection	100.0	202.2	225.1	493.5	653.5
Xray	100.0	175.0	180.0	239.5	335.2
Laboratory	100.0	263.3	301.1	733.5	820.6
Operation & Delivery	100.0	182.5	153.8	259.0	357.9
Doctor's Fee		100.0	157.8	323.0	309.0

Table 12. Percentage Distribution of Patients by Category of Discount

Reason of Discount	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
No Discount	69.5	87.7	90.3	87.9	82.1
Academic Free	0.3	0.5	1.5	2.0	2.2
Charity & Social Service	12.2	3.2	3.7	3.9	2.3
Discount for Student, Staff & Family	2.4	2.3	1.9	2.4	3.6
Discount for Ex-staff, Group & Professionals	0.4	0.1	0.5	2.4	5.0
Unknown & Others	15.3	6.3	2.2	1.4	4.8
Total	100.0	100.0	100.0	100.0	100.0

non-surgical care of accidents and diseases of the circulatory system increased sharply. For surgical cases, there was a sharp increase between 1965 and 1970 in the cost of the care of accidents (Appendix Tables 8 and 9).

### 3. Discounts granted on hospital care expenses

In studying the discounts granted on hospital care costs, no differentiation was made between those cases in which expenses were partially discounted and those which received all care free of cost.

In 1955, approximately 30% of all patients received either discounts on their hospital care expenses or were cared for free of charge. This percentage had dropped sharply by 1960. It had increased slightly by 1965 and thereafter decreased slightly.

The percentage of academic free cases gradually increased over the twenty-year period. After 1955 (when the percentage of charity or

social service cases was 12.2%), the range of percentages for these patients was 2.3~3.9%.

The percentage of ex-staff members, university alumni, health professionals and other groups receiving discounts showed an increase over previous periods in the years 1970 and 1974 (Table 12).

## DISCUSSION

### A. Methodology

The private university hospital was chosen for the study because the systematic safekeeping and maintenance of both medical and administrative records made possible the retrieval of data of previous years. It would have been valuable to have been able to make a comparison with other hospitals in Seoul, and in selected rural areas, but it is virtually impossible to obtain reliable data from such sources, and medical and

administrative records kept by these institutions vary greatly. Moreover, these institutions are reluctant to permit study of their records. If data from these hospitals had been analyzed, the characteristics of hospital utilization and costs could have been described but significant analysis would not have been possible.

There may be certain characteristics of the selected institution that would place limitations on a study of hospital records: as the private university hospital is the oldest of its kind in Korea and is one of the Republic's prominent teaching institutions, admitted to it may be more severe cases of illness, and more referrals from other clinics and hospitals, than is usual for most general hospitals. Also, there may be differences in terms of the patients' ages, sex, socio-economic status, religion, places of residence, and other factors (Bang and Kim, 1970).

Whereas the results of this study may not represent hospital care utilization and cost patterns in this country, the changes occurring over the twenty-year period indirectly demonstrate trends in such utilization and cost patterns. Basic data on hospital care in Korea being unavailable, this study is valuable in providing same. On the basis of the following hypotheses, the hospital care patterns of other general and teaching hospitals (in Seoul and other cities) would be similar:

1. The methods of diagnosis and treatment of the selected institution are the same as those of other general and teaching hospitals, in large urban settings;
2. As the cost of hospital care is based on a free market system within a permissive society, consumption expenditure is more or less equalized, with the exception of that for care in special institutions such as tuberculosis, sanatoria, mental hospitals, etc.

The base year of 1955 was selected for two reasons: the Korean War, which started 25 June 1950, so disrupted the country that data collected prior to the War were incompletely preserved; the socio-economic instability at that time would introduce bias if the raw data of those years were used. Data were collected from the records of every fifth calendar year, starting with 1955, for the following reasons: to limit money and time invested in the conduct of the study, to facilitate sampling, and to permit clearer identification of changes.

Factors involved in the compilation and analysis of the data were:

1. Prior to 1965, information on the newborn was included on the mother's record; subsequently each newborn has had a separate registration number and record. Therefore, the newborn were included in certain aspects of the analysis, and excluded from others.
2. Places of residence were based on the addresses given when the patients were admitted to hospital. A decision was made to classify residences in terms of the districts of Seoul, cities other than Seoul, and the pooling of county-level dwellers. However, as the number of county-level dwellers was too small for analysis, all residents of cities other than Seoul and of counties were reclassified into residents of either Gyeonggi Province or of "other provinces".

It is to be noted that, over the years, Seoul City was expanded geographically to include areas previously parts of Gyeonggi Province. This did not have to be considered because analysis based on the place of residence at the time of admission was meaningful, and the development of roads and means of public transportation over

the years decreased distances to be traveled.

3. Consideration was given to analyzing data on the basis of the clinical departments to which patients were admitted but this was not done because certain departments were subdivided into several units.

The kind of hospital care varies with the incidence of disease and can be influenced by the number of medical doctors, and their specialization. An attempt was made to determine the character of medical manpower available in each of the years selected for the study but the necessary data was not available. The kind of hospital care was determined, therefore, on information taken directly from the patients' records only.

4. The average length of stay in hospital is influenced by the inclusion in the sample of a limited number of long-term patients. Therefore, the average length of stay was calculated not only in terms of the total number of patients in the sample, but also of the number who were discharged in less than three months.
5. There was definite inflation in the cost of living over the twenty-year period of the study, and in 1962 there was a currency devaluation, from "hwan" to "won", of 10 to 1. The specific hospital care expenses for each of the selected years of the study were translated into a 1970 constant market price with the Seoul consumer price index, as this was considered to be the most suitable economic index for adjusting this data.

An index of expenses was devised whereby the base year -1955- was 100, and the cost of the various components of hospital care were appropriately indexed, through

calculation against this base. This indexing permitted the portrayal of changes in expenses over the twenty-year period, and the analysis of the relative increases in the cost of hospitalization in the selected years.

It is to be emphasized that the total and components of hospital care expenses for each of the selected years were indexed based on those of 1955, and it is to be understood that indices showing relative increase in cost compare with the 1955 index per se only. To illustrate the importance of this consideration: the actual content of hospital care expenses may differ in years subsequent to 1955, but the degree of increase in costs due to difference in content is not revealed.

#### B. Age and Sex Distribution of Patients

It was thought that, in view of the increase in the length of life expectancy, the average age of patients admitted to hospital would increase over the years. However, it was found that, with the exception of the year 1965, the mean age remained around 29 years.

In 1965, there was a higher proportion of males in the 30, 40 and 50 year age groups, and of females in the latter two groups. In this same year, there was a decrease in the number of female patients who were in their 20s.

#### C. Hospital Care Utilization

##### 1. Average length of hospitalization

Study of statistics for the major hospitals in Korea reveals that the average length of stay in the private university hospital was shorter in 1960, 1965 and 1970 (Table 13).

Direct comparison cannot be made between the data collected for this study and that given

Table 13. Average Length of Hospital Stay in Major Hospitals

(Korea, 1960~1973)

Year	Number of Hospitals	Average Length of Hospital Stay (Days)
1960	103	26
1961	103	20
1962	105	18
1963	116	19
1964	125	18
1965	136	17
1966	173	16
1967	202	18
1968	208	16
1969	219	16
1970	211	14
1971	237	14
1972	170	13
1973	181	12

(Yearbook of Public Health and Social Statistics, Ministry of Health and Social Affairs)

for the major hospitals of Korea because the latter include institutions for the care of patients with tuberculosis, other infectious diseases, and mental illness.

A hospital census (Korean Hospital Association, etc., 1972) showed the average length of stay in 201 hospitals to be 14.1 days in 1971; for the hospital of this study, the average was 12.6 days. and for two other large university hospitals, one national and one private, the figures were 13.5 and 14.1 days respectively.

In the United States of America, the length of hospitalization in non-federal, short-term general hospitals and other special hospitals decreased between 1946 and 1960 - 9.1 days in 1946, 8.1 days in 1950, 7.8 days in 1955 and 7.6 days in 1960 - and increased slightly thereafter, to 7.8 days in 1965 and 8.2 days in 1970.

There are a number of reasons for differences in the length of hospitalization, including the case-mix of long-term patients and the allotment of special beds for infections and other

diseases. In general, long-term patients included in the present study remained in hospital for 6 months. One patient in 1965 and two in each of 1970 and 1974 were hospitalized for periods exceeding one year. In all, the average length of hospitalization of patients included in this study exceeded that of patients in the United States of America.

The majority of patients included in the sample (87~96%) were discharged from hospital within one month of admission, and almost all (97.5 to 99.4%) within 3 months.

In respect to the type of accommodation, the longest stay in hospital was that of patients accommodated in the free ward. The free ward was utilized by academic and charity patients, who were for the most part suffering from severe illnesses, and did not have to worry about the cost of the services received.

In respect to the average length of hospitalization as related to the kind of hospital care received, there was an increase in that of non-surgical patients who had been involved in accidents. It is thought that increase in the severity of accidents may account for this finding. For neoplasms involving surgery, there was a decrease in the average length of hospitalization, but no significant change occurred in respect to the length of stay of non-surgical patients with such conditions. It is thought that patients eligible for surgery (for neoplasms) were operated on sooner after admission, and subsequently discharged within a shorter period of time whereas, there being no great changes in the non-surgical treatment regime for such patients, the length of hospitalization remained about the same. Other possible reasons for a decrease in the average length of hospitalization are: medical progress which led to more rapid diagnosis and intensification of treatment; increased hospitalization

costs leading to patients pressuring to be discharged sooner; patients having been admitted to hospital at an earlier stage of the disease process, or with less severe conditions.

## 2. Residence areas of patients

Over the twenty years included in the study, the administrative districts of Seoul were enlarged and areas of Gyeonggi Province were incorporated into the city. Also, residents of the Jongno and Junggu districts (which are centrally located in Seoul) were moved to newly developed areas of the city. Therefore, it was possible to determine the percentage of the total population of Seoul which utilized the in-patient services of the study's hospital in each of the selected years.

The building of additional bridges across the Han River - the Second Han River Bridge in 1965 and the Great Bridge of Seoul in 1971 - facilitated travel between the northern and southern sectors of the city of Seoul, through changes made in functional distances. Travel to the capital city from other parts of the country was also made easier by the provision of express bus services on the main highways. However, the findings of the study show no significant differences over the twenty-year period in the percentages of patients whose residences were in the rural areas, in Seoul City [as a whole, or in the districts farthest removed from the selected hospital (namely Dongdaemun, Seongdong and Seongbug districts).

The percentage of patients with residences in the Yeongdeungpo district increased in 1970 and 1974, following the construction of the above-mentioned bridges and the provision of improved means of transportation. In 1965 and thereafter, the percentage of patients from Seodaemun district was highest, and there was an increase in this percentage during the period of the study.

The findings indicate that hospital utilization is somewhat regionalized.

## 3. Diagnoses

It was initially intended that the D List of the International Classification of Diseases (300 causes for the tabulation of hospital morbidity) would be used for the study but, on the basis that the D List contained too many diagnoses to permit meaningful analysis, the A List (150 causes for the tabulation of morbidity and mortality) was selected. However, the number of cases being insufficient to permit analysis by disease classification, only the most frequently occurring conditions were analyzed by disease category.

The percentages of patients with appendicitis and tonsillar hypertrophy decreased over the years. This may have been due to the fact, recognizing surgery for these conditions as being relatively simple, patients increasingly utilized small hospitals or local clinics for such care.

When the conditions were classified by system, the proportionate occurrence of the various conditions was not found to vary over the period of the study: obstetrical care ranked highest, with gastrointestinal diseases, infectious (including tuberculosis) and parasitic diseases, accidents, neoplasms and respiratory diseases ranking in descending order.

## 4. Patient status at discharge

The percentage of patients who had recovered (or had been cured) by the time of discharge from hospital was seen to increase in the successive years of the study. It is thought that progress in medical care services and hospitalization at earlier stages of disease were responsible for this increase. It is considered that decrease in the percentage of deaths, and increase in that of neoplasm sufferers who were cured, can also be attributed to progress in medical science and earlier hospitalization.

#### D. Hospital Care Expenses

##### 1. Components of hospital care expenses

The administrator bases on the factor of demand, the allocation of hospital beds according to class. Therefore, the number of rooms allocated to each class will depend on this demand. The limitation in the number of rooms allocated to each class results in patients being on occasion admitted to a room of a class other than that of their choosing. It is common practice to move such patients to the room of the class of their choice, once such is available. It would have been valuable to have been able to analyze the distribution of rooms by class, and the allocation of rooms for special purposes (such as the care of the newborn, tuberculosis patients, etc.), year by year of the period of the study, but it was not possible to obtain the required data.

In each of the years selected for the study, the utilization of the ward class of accommodation ranked top, but there was a steady increase in patients wishing private rooms.

Hospital services can be divided into two major components: those which are the same as are available in a hotel, and those related to medical care. Over the years, increase in the income and consumption levels of the population has led to an increase in demand for certain non-medical care furnishings and facilities during hospitalization, including such items as sofas, air conditioners, television sets, and refrigerators. This increase in hotel-type services contributes in part to increases in total hospital care expenses.

Over the years of the study, the percentage of the total hospital care expenses which went for room and treatment remained at about 40%. Charges for the "room" included the cost of meals and the basic services (taking blood pressure, checking other vital signs, etc.) given

by nurses and doctors. Charges for medical care services included those for treatment and those for diagnosis. Drugs, injections, surgical operations and assistance at delivery were included under treatment. X-ray and laboratory services were included under diagnosis. The percentage of the total cost which went for X-ray and laboratory services was approximately that required for drugs and injections, indicating that diagnostic services were by no means inexpensive.

##### 2. Increase in hospital care expenses

The most important problem area in the provision of hospital care services today is the increasing cost of these services. For example, in the United States of America, there was an increase between 1950 and 1970 of 61% on all items, with increases in individual items being 54% for food, 63% for housing, 65% for transportation and 125% for medical care (U.S. Department of Commerce, 1971).

In the Republic of Korea, a sampling of urban households by the Economic Planning Board, in the late 1960s and early 1970s revealed increases in consumption expenditures and in proportionate medical care expenses (Table 14).

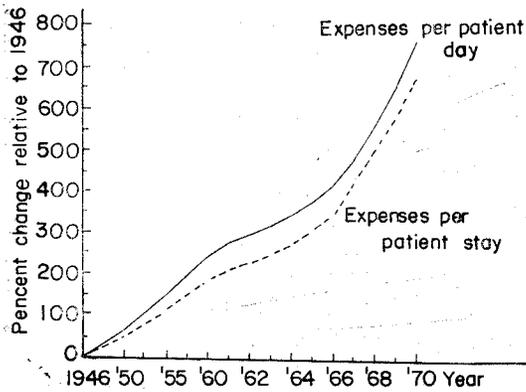
The major reasons for increase in the costs of medical care services are: firstly, continuous progress in the discovery of new diagnoses, the development of new equipment and facilities for better care, the production of fascinating new drugs, etc.; secondly, the rapid increase in expenditure on personnel, automation not being for the most part applicable to the medical care services (Klarman, 1970).

Using a constant market price as a base, it was revealed in this study that hospital expenses per stay increased 4.4 times, while expenses per hospital day increased 6.2 times. It is believed that the latter increase resulted from intensive care having been afforded.

**Table 14. Medical Care Expenses of All Families (City) (Korea, 1966~1973)**

Year	Consumption Expenditure (Won) (A)	Medical Care Expenses (Won) (B)	$\left(\frac{B}{A}\right) \times 100$
1966	13,560	170	1.3
1967	20,620	340	1.6
1968	23,190	670	2.9
1969	26,070	790	3.0
1970	29,950	920	3.1
1971	34,970	910	2.6
1972	38,560	1,020	2.6
1973	41,490	1,090	2.6

(Economic Planning Board Statistical Year Book 1966~1973)



**Fig. 4. Percentage Change in Hospital Costs for Nonfederal, Short-Term General and Other Special Hospitals (U.S.A.)**

In non-federal, short-term general hospitals in the United States of America, the expenditure per hospital day was US \$ 9.40 in 1946 and US \$ 81.00 in 1970 (Hospital Statistics, 1971; Figure 4).

It is to be noted that the curves showing increase over the years in expenses per patient day and expenses per patient stay run along almost parallel lines. It is thought that this finding is due to the fact that the duration of stay in hospital in the United States had stabilized at one of minimum length.

3. Changes in the cost of the components of hospital care services

The study revealed sharp increases in costs related to the provision of laboratory services, and of drugs and injections. The former increase is believed to have resulted from increase in the number of laboratory procedures carried out, and in the unit cost of laboratory examinations. As far as drugs and injections are concerned, in Korea there is a difference between the purchase cost of a drug or an injection and that charged to the patients because it is customary to add to the purchase cost a diagnosis or doctor's fee. This, then, might have contributed to the increase in the cost on these components of hospital care, as would have the increasing use of expensive antibiotics.

One special consideration in respect to increase in costs is to be noted: in the early years included in the study, a proportion of the supply of such items as chemical reagents, X-ray films and drugs were obtained from non-market sources, such as the armed forces. From the late 1960s, these items had to be imported directly and were subject to high import taxes. This resulted in sharp increases in the cost of all hospital supplies and equipment.

The reason for the lack of proportionate increase in the cost of X-ray services in 1970, as compared to laboratory, drug and injection costs, is not understood.

4. Discounts granted on hospital care expenses

The gradual increase over the twenty-year period of academic free cases revealed a desirable trend. In 1974, discounts on hospital care expenses which were granted to ex-staff members, medical professionals, alumni and other groups showed a sharp increase over previous years. This resulted in part from contracts made between the hospital and certain organizations and institutions, making for a decrease in the financial burden borne directly

by the individual medical care consumer.

### SUMMARY

To study the changing pattern of hospital utilization and cost of care over a twenty year period, analyzed was a sample of 7,798 records of patients discharged from a private,<sup>1</sup> university hospital in the years 1955, 1960, 1965, 1970 and 1974. To permit comparison of costs, the specific consumption expenses in each of the selected years was revalued to a constant market price, on the basis of the 1970 consumer price index of the Economic Planning Board, and an index used whereby 1955 (as the base year) was 100.

The findings of the study included:

1. The length of hospital stay decreased year by year, and surgical patients remained in hospital 3~4 days longer than did non-surgical;
2. The majority of patients were discharged from hospital within one month of admission, and all but 1~2% within 3 months;
3. Approximately 80% of the patients were residents of Seoul City, and about two thirds of these resided in the district in which is located the hospital and those neighbouring on this district;
4. Despite measures which were taken to facilitate transportation, regionalization was shown in hospital utilization;
5. The proportionate occurrence of the major conditions (for the care of which the patients were admitted to hospital) did not vary over the period of the study: obstetrical care ranked top and following in order were cases of gastrointestinal disease, infectious and parasitic diseases, accidents, neoplasms and respiratory diseases.
6. The percentage of patients who had recovered at the time of discharged increased, and that of those who died decreased;
7. The cost of hospital stay increased 4.4 times over the twenty-year period and that of hospital day increased 6.2 times, it being considered that the latter increase resulted from intensification of medical care and lessening of hospital stay;
8. In respect to the cost of the components of hospital care services, approximately 40% was for room and treatment and about 20% for drugs and injections. Among the costs, most prominent were increases in charges for laboratory services, drugs and injections, resulting it is considered from the production of new drugs and the development of new diagnostic techniques.

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## APPENDIX

A study of to hospital utilization by and cost of care to patients in a private universty hospital in Seoul, Republic of Korea, 1955-1974

Table 1. Percentage Distribution of Patients by Sex

Sex	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Male	47.7	50.6	51.1	46.3	48.0
Female	52.3	49.4	48.5	53.6	52.0
Unknown			0.4	0.2	0.1
Total	100.0	100.0	100.0	100.1	100.1

Table 2. Cummulative Percentage of Length of Hospital Stay

Days	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
~ 4	21.1	18.1	20.7	35.3	34.5
5~ 9	47.1	51.9	60.1	66.6	72.0
10~14	64.7	67.9	75.5	80.4	84.4
15~19	75.9	77.6	84.6	86.5	91.0
20~24	83.1	84.6	89.4	89.7	94.7
25~29	86.9	88.2	92.5	92.4	95.9
30~59	95.3	96.2	97.6	97.1	98.7
60~89	97.5	98.4	99.0	98.3	99.4
90 & Over	100.0	100.0	100.0	100.0	100.0

Table 3. Average Length of Hospital Stay by Type of Accommodation

Type of Accommodation	1955		1960		1965		1970		1974	
	Mean	S.E.								
Special Ward										
Surgical	※		※		※		10.5	2.0	12.4	1.4
Non-surgical	13.3	2.5	9.6	2.5	9.2	1.4	9.8	1.0	7.9	0.7
Private Room										
Surgical	14.0	1.6	16.8	2.6	15.3	1.9	17.8	3.9	12.0	2.2
Non-surgical	12.6	1.8	14.3	1.7	9.7	0.8	10.3	1.6	7.4	0.5
Semi-private Room										
Surgical	13.6	1.4	14.6	0.9	9.8	0.9	15.2	1.7	12.4	1.4
Non-surgical	11.6	1.0	12.0	0.8	10.4	0.7	10.2	0.8	7.4	0.5
Ward										
Surgical	16.3	0.7	17.2	0.8	14.8	0.7	15.5	0.8	11.3	0.5
Non-surgical	13.4	0.8	11.5	0.7	10.6	0.4	9.1	0.4	8.2	0.3
Free Ward										
Surgical	28.8	3.0	34.6	4.9	21.3	1.8	23.5	3.8	3.4	2.2
Non-surgical	22.3	1.7	32.1	5.3	20.8	3.3	18.7	3.1	18.9	4.9

Figures omitted because of small quantity.

S.E.: Standard Error

Table 4. Average Length of Hospital Stay for Non-surgical Care by Disease Group

Disease Group	1955		1960		1965		1970		1974	
	Mean	S.E.								
Infective & Parasitic Diseases (except Tuberculosis)	14.8	3.3	11.2	1.5	11.3	1.5	13.7	2.9	9.4	1.4
Tuberculosis	23.4	34.4	14.1	2.5	14.8	1.4	14.8	2.0	11.5	1.1
Neoplasms	13.4	1.2	14.1	2.2	11.3	1.3	18.2	2.8	12.1	1.6
Mental Disorders	17.8	2.4	29.3	6.6	19.7	4.1	28.7	5.6	22.4	5.8
Diseases of Circulatory System	19.7	3.9	18.4	3.0	10.7	1.3	9.8	0.9	9.3	1.5
Diseases of Respiratory System	23.1	5.8	12.7	1.9	8.1	0.9	7.9	0.8	6.1	0.4
Diseases of Digestive System	17.5	2.7	12.2	1.4	9.2	0.6	9.9	0.6	7.1	0.6
Diseases of Genito-Urinary System	21.1	3.3	18.9	5.9	10.6	1.5	13.7	3.3	9.0	1.1
Accidents, Poisonings & Violence	12.3	1.7	9.3	1.9	13.2	2.1	13.1	1.9	14.3	3.1

Note: Only disease groups of significant incidence included.  
S.E.: Standard Error

Table 5. Average Length of Hospital Stay for Surgical Care by Disease Group

Disease Group	1955		1960		1965		1970		1974	
	Mean	S.E.								
Tuberculosis	40.7	9.5	23.7	1.6	26.3	3.0	20.3	4.0	17.8	2.3
Neoplasms	24.1	1.9	27.1	3.0	17.9	1.3	18.2	1.9	13.8	1.7
Diseases of Nervous System & Sense Organs	28.0	4.6	13.2	1.2	16.4	3.1	17.3	9.7	10.5	1.3
Diseases of Respiratory System (except Hypertrophy of Tonsils)	9.2	0.8	11.3	2.3	10.6	0.2	14.2	3.2	6.6	0.7
Hypertrophy of Tonsils	3.9	0.5	3.7	0.4	3.5	0.3	3.1	0.3	2.9	0.2
Diseases of Digestive System (except Appendicitis)	28.9	6.6	20.6	3.5	17.3	1.8	19.3	3.0	13.7	1.1
Appendicitis	13.6	1.0	9.9	1.2	6.1	0.5	6.9	1.1	7.6	0.8
Diseases of Genito-Urinary System	15.0	3.0	10.5	1.0	7.9	0.7	11.1	1.2	9.5	1.1
Diseases of Musculo-Skeletal System	16.5	1.9	18.2	1.2	16.9	1.9	22.4	3.0	11.3	1.2
Accidents, Poisoning & Violence	32.4	4.6	31.5	5.2	29.1	6.8	35.7	5.6	25.1	4.2

Note: Only disease groups of significant incidence included  
S.E.: Standard Error

Table 6. Percentage Distribution of Patients by Disease Group

Disease Group	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
I. Infective & Parasitic Diseases	8.8	10.5	14.0	11.7	10.6
(Tuberculosis)	5.7	7.2	9.4	5.2	4.7
II. Neoplasms	9.5	8.6	11.5	5.8	9.5
III. Endocrine, Nutritional, & Metabolic Diseases	2.5	1.7	1.4	1.3	2.0
IV. Diseases of Blood & Blood-forming Organs	0.6	0.8	0.5	0.5	0.6
V. Mental Disorders	0.6	2.8	4.5	3.5	2.0
VI. Diseases of Nervous System & Sense Organs	4.9	4.4	3.9	3.1	4.1
VII. Diseases of Circulatory System	4.2	7.1	6.8	5.0	6.5
VIII. Diseases of Respiratory System	12.0	9.1	8.0	5.2	6.6
K. Diseases of Digestive System	14.3	13.8	15.5	9.7	9.5
(Appendicitis)	5.6	2.6	2.3	1.1	1.3
X. Diseases of Genito-Urinary System	4.8	5.2	5.5	3.8	4.8
XI. Complications of Pregnancy Childbirth & the Puerperium	16.7	12.6	9.3	17.7	13.5
(Delivery, Normal)	10.0	6.6	6.8	11.3	7.6
XII. Diseases of the Skin & Subcutaneous Tissue	1.1	1.9	2.0	2.1	2.4
XIII. Diseases of Musculo-Skeletal System & Connective Tissue	2.2	5.6	4.6	3.0	2.6
XIV. Congenital Anomalies	0.9	1.8	1.2	1.6	2.0
XV. Certain Causes of Perinatal Morbidity & Mortality	0.4	0.9	0.5	1.9	1.5
XVI. Symptoms and Ill-defined Conditions	1.0	2.0	2.1	0.8	1.9
XVII. Accidents, Poisonings & Violence	14.3	9.8	7.7	8.8	8.0
XVIII. New born				14.0	10.1
XIX. Other	1.2	1.4	1.0	0.5	1.7
Total	100.0	100.0	100.0	100.0	99.9

Table 7. Recovery Rate at Discharge of Neoplasm Patients

Outcome of Treatment	1955 (%)	1960 (%)	1965 (%)	1970 (%)	1974 (%)
Neoplasm (Surgical)	100.0 (N=86)	100.1 (N=68)	100.1 (N=104)	100.1 (N=63)	100.0 (N=77)
Recovered	79.1	76.5	88.5	92.1	93.5
Non-recovered	11.6	16.2	10.6	4.8	5.2
Self-discharged	3.5	5.9			1.3
Dead	5.8	1.5	1.0	3.2	
Neoplasm (Non-surgical)	100.0 (N=34)	99.9 (N=46)	100.0 (N=81)	100.0 (N=46)	99.9 (N=85)
Recovered	5.9	13.0	19.8	26.1	37.6
Non-recovered	58.8	60.9	61.7	65.2	49.4
Self-discharged	23.5	13.0	9.9	6.5	9.4
Dead	11.8	13.0	8.6	2.2	3.5

**Table 8. Relative Increase of Daily Hospital Expenses for Surgical Care**

(1955=100)

Diseases	1955	1960	1965	1970	1974
Tuberculosis	100.0	201.8	251.9	417.7	578.3
Neoplasms	100.0	213.4	280.1	525.3	757.8
Diseases of Nervous System & Sense Organs	100.0	348.2	360.9	834.9	910.2
Diseases of Respiratory System (except Hypertrophy of Tonsils)	100.0	195.5	213.1	497.9	536.6
Hypertrophy of Tonsils	100.0	213.4	253.3	492.3	631.2
Diseases of Digestive System (except Appendicitis)	100.0	288.0	324.6	764.6	778.3
Appendicitis	100.0	264.8	349.4	687.7	716.1
Diseases of Genito-Urinary System	100.0	206.4	267.6	564.6	751.2
Diseases of Musculo-Skeletal System	100.0	250.6	347.1	675.6	804.0
Accidents, Poisonings & Violence	100.0	344.6	328.2	1, 175.9	1, 536.2

**Table 9. Relative Increase of Daily Hospital Expenses for Non-surgical Care**

(1955=100)

Diseases	1955	1960	1965	1970	1974
Infective & Parasitic Diseases (except Tuberculosis)	100.0	218.2	253.9	452.6	553.5
Tuberculosis	100.0	261.4	313.0	468.8	662.1
Neoplasms	100.0	222.4	276.5	486.8	891.7
Mental Disorders	100.0	198.8	269.4	508.6	528.1
Diseases of Circulatory System	100.0	251.6	315.6	718.2	1, 018.6
Diseases of Respiratory System	100.0	232.6	331.8	500.5	607.6
Diseases of Digestive System	100.0	221.4	270.6	603.4	833.5
Diseases of Genito-Urinary System	100.0	227.9	359.3	738.7	865.9
Accidents, Poisonings & Violence	100.0	242.9	300.0	951.9	1, 006.6